

IN THE CLAIMS:

1 1. (CANCELLED)

1 2. (CURRENTLY AMENDED) The method as defined in claim 4-5 wherein the single
2 control structure includes an interface descriptor block (IDB) entry of an IDB database
3 and the method further comprises the step of:

4 applying a port identifier (ID) associated with the virtual port to the IDB database
5 to identify the IDB database entry associated with the virtual port.

1 3. (PREVIOUSLY PRESENTED) The method as defined in claim 2 wherein the identi-
2 fied IDB database entry contains a VLAN ID that represents the particular VLAN associ-
3 ated with the packet.

1 4. (CURRENTLY AMENDED) The method as defined in claim 4-5 wherein the packet
2 contains a the VLAN ID that identifies ~~represents~~ the particular VLAN associated with
3 the packet.

1 5. (CURRENTLY AMENDED) ~~The method as defined in claim 1 comprising the steps~~
2 ~~of:~~ In a data network comprising a plurality of nodes, a method for transferring data
3 packets between a source node and a destination node contained in the network, wherein
4 the source node and destination node belong to the same particular virtual-local-area net-
5 work (VLAN), the method comprising the steps of:

6 establishing a virtual port associated with the destination node, the virtual port
7 supporting a plurality of connections that are each associated with a different VLAN, a
8 particular connection associated with the particular VLAN;

9 maintaining a single control structure for the virtual port, the single control struc-
10 ture storing information associated with each connection of the plurality of connections,
11 the information including connection status and statistics for each connection of the plu-
12 rality of connections;

13 acquiring a data packet from the source node, wherein the packet is associated
14 with the particular VLAN and contains a destination address associated with the destina-
15 tion node;

16 applying the destination address contained in the packet and a VLAN ID that
17 identifies the particular VLAN associated with the packet to a forwarding database to lo-
18 cate a forwarding database entry that contains (i) a destination address that matches the
19 destination address contained in the packet and (ii) a VLAN ID that matches the VLAN
20 ID that identifies the particular VLAN associated with the packet; ~~and~~

21 identifying ~~a~~ the virtual port associated with the destination node using a port
22 identifier contained in the matching forwarding database entry; and

23 transferring the packet to the destination node over the particular connection via
24 the virtual port.

1 6. (CURRENTLY AMENDED) The method as defined in claim 1-5 comprising the steps
2 of:

3 applying a port identifier (ID) associated with the virtual port to an interface de-
4 scriptor block (IDB) database to identify an IDB database entry associated with the vir-
5 tual port;

6 locating a virtual port (VPORT) VLAN database using an address contained in
7 the IDB database entry;

8 applying a VLAN ID that identifies the particular VLAN associated with the
9 packet to the VPORT VLAN database to locate a VPORT VLAN database entry that
10 contains a VLAN ID that matches the VLAN ID that identifies the particular VLAN as-
11 sociated with the packet;

12 encapsulating the packet; and

13 transferring the encapsulated packet over a particular connection identified by a
14 connection ID contained in the matching VPORT VLAN database entry.

1 7. (PREVIOUSLY PRESENTED) The method as defined in claim 6 wherein the packet
2 is encapsulated in accordance with the Institute of Electrical and Electronics Engineers
3 (IEEE) 802.1Q standard.

1 8. (PREVIOUSLY PRESENTED) The method as defined in claim 6 comprising the steps
2 of;

3 acquiring the encapsulated packet;

4 decapsulating the acquired encapsulated packet to yield the original packet;

5 applying the destination address contained in the original packet to an address
6 translation database to determine if the destination address matches an internal address
7 contained in an entry in the database; and

8 if so, replacing the destination address in the original packet with an external ad-
9 dress contained in the matching entry.

1 9. (CURRENTLY AMENDED) The method as defined in claim +5 wherein the particu-
2 lar connection is a point-to-point protocol (PPP) connection.

1 10. (CURRENTLY AMENDED) The method as defined in claim +5 wherein the par-
2 ticular connection is an Asynchronous Transfer Mode (ATM) virtual connection (VC).

1 11. (CURRENTLY AMENDED) The method as defined in claim +5 wherein the par-
2 ticular connection is a frame relay connection.

1 12. (CURRENTLY AMENDED) The method as defined in claim +5 wherein the par-
2 ticular connection is a trunked connection.

1 13. (CURRENTLY AMENDED) The method as defined in claim +5 wherein the par-
2 ticular connection is associated with a connection identifier (ID).

1 14. (PREVIOUSLY PRESENTED) The method as defined in claim 13 comprising the
2 step of:

3 identifying an entry in a VLAN ID database that contains a virtual connection
4 (VC) ID that matches the connection ID.

1 15. (PREVIOUSLY PRESENTED) The method as defined in claim 13 comprising the
2 steps of:

3 acquiring an encapsulated packet on the particular connection;

4 identifying an internal VLAN ID associated with the particular connection's ID;

5 and

6 doubly encapsulating the encapsulated packet wherein the doubly encapsulated
7 packet contains the internal VLAN ID.

1 16. (PREVIOUSLY PRESENTED) The method as defined in claim 15 wherein the dou-
2 bly encapsulated packet is encapsulated in accordance with the Institute of Electrical and
3 Electronics Engineers (IEEE) 802.1Q standard.

1 17. (PREVIOUSLY PRESENTED) The method as defined in claim 15 comprising the
2 steps of:

3 applying a destination address contained in the doubly encapsulated packet to an
4 address translation database to determine if the destination address matches an external
5 address contained in an entry in the address translation database; and

6 if so, replacing the destination address contained in the doubly encapsulated
7 packet with an internal address contained in the matching entry.

1 18. (CURRENTLY AMENDED) In a data network comprising a plurality of nodes, a
2 method for transferring data packets between a source node and a destination node con-
3 tained in the network, wherein the source node and destination node belong to the same
4 virtual-local-area network (VLAN), the method comprising the steps of:

5 generating a data packet at the source node, wherein the data packet contains a
6 destination address associated with the destination node;

7 transferring the packet to a source intermediate node contained in the network;

8 at the source intermediate node, (i) acquiring the packet, (ii) identifying a particu-
9 lar VLAN associated with the packet, (iii) applying the destination address contained in
10 the packet and a VLAN ID that identifies the particular VLAN associated with the packet
11 to a forwarding database to locate a forwarding database entry that contains a destination

12 address that matches the destination address contained in the packet and a VLAN ID that
13 matches the VLAN ID that identifies the particular VLAN associated with the packet;
14 (iiiiv) identifying a virtual port through which the destination node may be reached using
15 a port identifier contained in the matching forwarding database entry, the virtual port sup-
16 porting a plurality of connections that are each associated with a different VLAN, (ivv)
17 maintaining a single control structure for the virtual port, the single control structure stor-
18 ing information associated with each connection of the plurality of connections, the in-
19 formation including connection status and statistics for each connection of the plurality of
20 connections, (vi) identifying a particular connection that is associated with the virtual
21 port and the packet's particular VLAN, and (vij) transferring the packet over the particu-
22 lar connection via the virtual port to a destination intermediate node contained in the net-
23 work; and

24 at the destination intermediate node, (i) acquiring the packet, (ii) identifying a port
25 through which the destination node may be reached and (iii) forwarding the acquired
26 packet to the destination node.

1 19. (PREVIOUSLY PRESENTED) A method as defined in claim 18 comprising the step
2 of:

3 at the source intermediate node, encapsulating the packet.

1 20. (PREVIOUSLY PRESENTED) The method as defined in claim 19 wherein the
2 packet is encapsulated in accordance with the Institute of Electrical and Electronics Engi-
3 neers (IEEE) 802.1Q standard.

1 21. (PREVIOUSLY PRESENTED) The method as defined in claim 18 wherein the par-
2 ticular connection is a point-to-point protocol (PPP) connection.

1 22. (PREVIOUSLY PRESENTED) The method as defined in claim 18 wherein the par-
2 ticular connection is an Asynchronous Transfer Mode (ATM) virtual connection (VC).

1 23. (PREVIOUSLY PRESENTED) The method as defined in claim 18 wherein the par-
2 ticular connection is a frame relay connection.

1 24. (PREVIOUSLY PRESENTED) The method as defined in claim 18 wherein the par-
2 ticular connection is a trunked connection.

1 25. (CURRENTLY AMENDED) An intermediate node comprising:

2 a line card coupled to a network wherein the line card is configured to acquire
3 data packets containing destination addresses; and

4 a processor configured to (i) establish one or more virtual ports wherein each vir-
5 tual port is associated with a plurality of connections and each connection is associated
6 with a virtual-local-area network (VLAN), (ii) associate an acquired packet with a par-
7 ticular VLAN, (iii) ~~maintaining~~ maintain a single control structure for the virtual port, the
8 single control structure storing information associated with each connection of the plural-
9 ity of connections, the information including connection status and statistics for each
10 connection of the plurality of connections, (iv) apply the destination address contained in
11 the packet and a VLAN ID that identifies the particular VLAN associated with the packet
12 to a forwarding database to locate a forwarding database entry that contains a destination
13 address that matches the destination address contained in the packet and a VLAN ID that
14 matches the VLAN ID that identifies the particular VLAN associated with the packet, (v)
15 identify a virtual port associated with a destination address contained in the acquired
16 packet using a port identifier contained in the matching forwarding database entry, (vi)

17 identify a particular connection associated with the VLAN and (vii) transfer the packet
18 over the particular connection via the virtual port.

1 26. (PREVIOUSLY PRESENTED) The intermediate node as defined in claim 25
2 wherein the connections are a combination of connection types.

1 27. (CURRENTLY AMENDED) An apparatus for transferring data packets between a
2 source node and a destination node contained in a data network, wherein the source node
3 and destination node belong to the same particular virtual-local-area network (VLAN),
4 the apparatus comprising:

5 means for establishing a virtual port associated with the destination node, the vir-
6 tual port supporting a plurality of connections that are each associated with a different
7 VLAN, a particular connection associated with the particular VLAN;

8 means for maintaining a single control structure for the virtual port, the single
9 control structure storing information associated with each connection of the plurality of
10 connections, the information including connection status and statistics for each connec-
11 tion of the plurality of connections;

12 means for acquiring a data packet from the source node, wherein the packet is as-
13 sociated with the particular VLAN and contains a destination address associated with the
14 destination node;

15 means for applying the destination address contained in the packet and a VLAN
16 ID that identifies the particular VLAN associated with the packet to a forwarding data-
17 base to locate a forwarding database entry that contains (i) a destination address that
18 matches the destination address contained in the packet and (ii) a VLAN ID that matches
19 the VLAN ID that identifies the particular VLAN associated with the packet;

20 means for identifying the virtual port associated with the destination node using a
21 port identifier contained in the matching forwarding database entry; and

22 means for transferring the packet to the destination node over the particular con-
23 nection via the virtual port.

1 28. (CURRENTLY AMENDED) A computer readable medium comprising computer
2 executable instructions for execution in a processor, the medium comprising instructions
3 for:

4 establishing a virtual port that is associated with a destination node, contained in a
5 data network, the virtual port supporting a plurality of connections that are each associ-
6 ated with a different VLAN, a particular connection associated with a particular virtual-
7 local-area network (VLAN);

8 maintaining a single control structure for the virtual port, the single control struc-
9 ture storing information associated with each connection of the plurality of connections,
10 the information including connection status and statistics for each connection of the plu-
11 rality of connections;

12 acquiring a data packet wherein the packet is associated with the particular VLAN
13 and contains a destination address associated with the destination node;

14 applying the destination address contained in the packet and a VLAN ID that
15 identifies the particular VLAN associated with the packet to a forwarding database to lo-
16 cate a forwarding database entry that contains (i) a destination address that matches the
17 destination address contained in the packet and (ii) a VLAN ID that matches the VLAN
18 ID that identifies the particular VLAN associated with the packet;

19 identifying the virtual port associated with the destination node using a port iden-
20 tifier contained in the matching forwarding database entry; and

21 transferring the packet to the destination node over the connection via the virtual
22 port.

1 29. (PREVIOUSLY PRESENTED) The intermediate node of claim 25 wherein the single
2 control structure includes an interface descriptor block (IDB) entry of an IDB database
3 that is identified by a port identifier (ID) associated with the virtual port.

1 30. (PREVIOUSLY PRESENTED) The apparatus of claim 27 wherein the means for
2 maintaining comprise a interface descriptor block (IDB) database and the single control
3 structure includes an IDB database entry identified by a port identifier (ID) associated
4 with the virtual port.